to generation, certain habits prevailing in certain communities in consequence neither of inherited instincts nor of individual experience, but simply because the young ones imitate what they see in their elder fellows?

As is well known, the stingless honey-bees (*Melipona* and *Trigona*) build horizontal combs consisting of a single layer of cells, which, if there is plenty of space, are of rather regular shape, the peripheral cells being all at about the same distance from the first built central one. Now, on February 4, 1874, I met with a nest of a small Trigona ("Abelha preguicosa") in a very narrow hole of an old canella-tree, where, from want of space they were obliged to give to their combs a very irregular shape, corresponding to the transversal section of the hole. These bees lived with me, in a spacious box, about a year (till February 10, 1875), when perhaps not a single bee survived of those which had come from the canella-tree; but notwithstanding they yet continued to build irregular combs, while quite regular ones were built by several other communities of the same species, which I have had.

The following case is still more striking. In the construction of the combs for the raising of the young, as well as of the large cells for guarding honey and pollen, our *Meliponæ* and *Trigonæ* do not use pure wax, but mix it with various resinous and other substances, which give to the wax a peculiar colour and smell. Now I had brought home from two different and distant localities two communities of our most common *Melipona* (allied to *M. marginata*), of which one had dark reddish-brown, and the other pale yellowish-brown wax, they evidently employing resin from different trees. They lived with me for many years, and either community continued, in their new home, to gather the same resins as before, though now, when they stood close together, any tree was equally accessible to the bees of either community. This can hardly be attributed to inherited instinct, as both belonged to the same species, nor to individual experience about the usefulness of the several resins (which seemed to serve equally well), but only, as far as I can judge, to tradition, each subsequent generation of young bees following the habits of their elder sisters.

FRITZ MUELLER

Blumenau, St. Catharina, Brazil, November 14, 1882

The Inventor of the Incandescent Electric Light

IN the "Notes" of NATURE, vol. xxvii. p. 209, M. de Chagny is described as "the first electrician who attempted to manufacture incandescent lamps *in vacuo* about twenty years ago." This invention and its successful practical application (irrespective of cost) was made by a young American, Mr. Starr, and patented by King in 1845. A short stick of gas-retort carbon was used, and the vacuum obtained by connecting one end of this with a wire sealed through the top of a barometer tube blown out at the upper part, and the other end with a wire dipping into the mercury. The tube was about thirty-six inches long, and thus the enlarged upper portion became a torrecellian vacuum when the tube was filled and inverted. I had a share of one-eighth in the venture, assisted in making the apparatus and some of the experiments, and after the death of Mr. Starr all the apparatus was assigned to me. I showed this light (in the original lamp) publicly many times at the Midland Institute, Birmingham, and on two occasions in the Town Hall, all of them more than twenty years ago. The light was far more brilliant, and the carbon-stick more durable, than the flimsy threads of the incandescent lamps now in use. It was abandoned solely on account of the cost of supplying the power. As a steady, reliable, and beautiful light, its success was complete. In "A Contribution to the History of Electric Lighting," published in the *Journal of Science*, November 5, 1879, and reprinted lately in my "Science in Short Chapters," may be found further particulars concerning this invention and its inventor.

W. MATTIEU WILLIAMS

Stonebridge Park, N.W.

The Reversion of Sunflowers at Night

WHILE the fact that sunflowers turn their faces toward the sun in its course during the day is as old as our knowledge of the plant, I am not aware that any record has been made as to the time of night that they turn to the east again after their obeisance to the setting sun.

One evening during a short stay at a village in Colorado, in the summer of 1881, I took a walk along the banks of a large irrigating ditch just as the sun was setting. The wild variety of *Helianthus annuus*, Lin. (=*H. lenticularis*, Douglass) grew abundantly there, and I observed that the broad faces of all the flowers were, as is usual in the clear sunset, turned to the west. Returning by the same path less than an hour afterwards, and immediately after the daylight was gone, I found, to my surprise, that much the greater part of those flowers had already turned their faces full to the east in anticipation, as it were, of the sun's rising.

They had in that short time retraced the semi-circle, in the traversing of which with the sun they had spent the whole day. Both the day and night were cloudless, and apparently no unusual conditions existed that might have exceptionally affected the movements of the flowers.

I doubt not that many persons like myself have supposed that sunflowers remain all night with their faces to the west, as they are when the sunlight leaves them, and until they are constrained by the light of the rising sun, to turn to the east again. It is not my purpose to offer any explanation of the cause of the phenomenon here recorded, but it seems to me improbable that it could have been an exceptional instance; and I only regret that no opportunity has since occurred to me to repeat the observation.

Washington, December 26 C. A. WHITE

Pollution of the Atmosphere

MR. H. A. PHILLIPS, in NATURE, vol. xxvii. p. 127, thinks that the effect of the increasing quantity of hydrocarbons in the air from the combustion of coal will be to make climates more extreme. It seems to me the effect will be the direct contrary. Gaseous and vaporous hydrocarbons absorb heat much more powerfully than air, and whatever makes the atmosphere absorb and retain more solar heat than at present will tend to equalise temperatures between day and night, and also between different latitudes. I think, however, that any possible effect of hydrocarbons will be quite insignificant in comparison with the effect of the watery vapour of the atmosphere, which, as Tyndall has shown, moderates climates by its power of absorbing solar heat.

JOSEPH JOHN MURPHY

Old Forge, Dunmurry, Co. Antrim, December 28, 1882

A "Natural" Experiment in Complementary Colours

ON page 79 of vol. i. of the "Life, Letters and Journal of Sir Charles Lyell," his visit to the Fall of the Rhine at Schaffhausen is described, and he notes that "as the sun shone on the foam it took very much the rose-coloured tint so remarkable on the snow in the Alps."

His experience as regards the colour being observed in the full sunlight seems to differ from that of Mr. Chas. T. Whitmell, which you published in NATURE, vol. xxvi. p. 573.

E. J. BLES

Moor End, Kersal, near Manchester, January 8

BAIRDS' HARE AND ITS HABITS

SEVERAL instances have been recorded in which individual male mammals have produced milk from their mammary glands for the nutriment of their young. But that the young of a mammal should be ordinarily suckled by the male parent is such an extraordinary anomaly that it is very hard to believe it. Yet that such is the case in an American species of hare (*Lepus bairdii*) would seem to be highly probable from observations made by Dr. Hayden and his party during one of their expeditions in the Yellowstone Mountains. In the last number of the *American Naturalist*, Mr. Lockwood gives the following details on this curious subject:—

"In the months of May and June, 1860, Prof. F. V. Hayden and his party of United States explorers found themselves up in the Alpine snows of the Wind River Mountains, where they were detained several days in an attempt to feel their way to the Yellowstone. On May 31 Dr. Hayden declared that a new species of hare was around, as he had observed unusually large hare-tracks in the snow. As the Doctor expressed himself to us:— The tracks were very large, the feet being wide-spread, and the hair thick between the toes, thus really furnishing

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the animal with snow shoes." In June, one was captured, and the Doctor named the species *Lepus bairdii.* The animal seemed limited to that small Alpine territory. But one specimen was secured, and no more was heard of this hare until 1872, when Dr. Hayden and party were in that region in the months of August and September. At this time five specimens of Baird's hare were obtained by Mr. C. Hart Merriam, the naturalist to the Hayden Survey. Of these four were adult males, and all had large teats and udders full of milk. The hair round the nipples was wet, and stuck to them, showing that they had just been suckling their young. To make all certain, resort was had to dissection, when the sex was demonstrated. Not only did Mr. Merriam make dissection, but also Dr. Josiah Curtis, a naturalist of the United States Geological Survey, with the same result. In the face of such testimony disbelief would seem discourtesy."

NOTES FROM THE LETTERS OF CAPTAIN DAWSON, R.A., IN COMMAND OF THE BRITISH CIRCUMPOLAR EXPEDITION[1]

July 30, *Fort Chipewyan, on Lake Athabasca*

AFTER practically incessant travel since leaving England, at last I find myself condemned to a week's rest, as there are no boats going to Port Rae until the Mackenzie River boats return. But here we are in the lap of luxury; we get bread, butter, and milk, which we have not tasted for ages, to say nothing of the novel experience of sleeping under a roof and on a bed. I have had a most delightful journey, but it all seems like a dream to look back to: my memory is a kaleidoscope of pine trees, rapids, lakes, and golden sunrises and sunsets. Down stream we travel day and night. At sunset the boats are lashed together, and then the crew go to sleep. It is very nice drifting down in the silence amongst the pines, but bed-time comes at last. I then roll myself in a blanket, lie down, and look at the stars till I fall asleep. At sunrise I wake to find the crew on the shore, boiling their kettle, and a cup of tea is very refreshing. My blanket and my hair, too, I find dripping wet with dew when I wake.

At noon or so we land, and cook more tea, and make breakfast usually off pemmican, which is composed of buffalo flesh dried and pounded, and put in a leather bag with grease poured over it. It is not nice, but it supports life. When we have such a luxury as flour, it is baked into cakes in a frying-pan. We get into the boat again, and eat our breakfast whilst drifting down stream. Bye-and-bye the current becomes more rapid, and at last we see the river disappearing in a cloud of spray. Here is a Portage, so the boats pull to shore and the cargo is landed. The crew then return. I take my place in the boat, and after each man has laid aside his pipe, settled himself in his seat, and got a good grip of his oar, we shove off and dash into the rapid as fast as twelve oars can take us, with shouts of "Hurrah! boys!" (the only English words the Indians know) and "ekwa," a Cree word, meaning "Come on." The guide or steersman stands on a seat in the stern steering the boat with a long oar—a picturesque figure, with his long black hair waving behind him. In a moment we are among the rapids, and seem to sink into a mass of foam, from which we emerge sideways, and are carried towards a projecting rock. Wild exclamations in French from the guide! the bow oarsman seizes a pole, and sends the boat off, and then we spin down the tail of the rapids, not without one or two bumps that make the whole frame of the boat quiver. The whole distance, a mile or two, is done in two or three minutes, and it is not bad fun. After the boats have run the rapids it is dinner-time, and then the crew set to work to carry the cargo over the portage—a work of two or three hours. In some places the boats themselves have to be hauled across on rollers, which is pretty hard work. We continue our way down stream, stopping about 4 o'clock for tea, and at sunset reach another Portage. Here we camp, and in a very short time the tents are pitched, a tree felled to make a camp-fire, and kettles singing thereon. Supper and bed-time make up the day. Such is a fair specimen of a day's river travelling. With a fair wind we sail, especially on the lakes.

The crews are Chipewyans; their language is chiefly made up of clicks and gurglings in the throat, and differs altogether from Sioux, Cree, and the other languages spoken further south.

A Roman Catholic priest here showed me a Chipewyan grammar and dictionary that they have composed. There are over sixty sounds in the language, so they have to invent additional letters. There is something Asiatic in the appearance of these Indians, with their small moustache and tufts of hair on their chin, quite unlike the Indian of the plain. They are Roman Catholic.

After leaving Portage la Loche, on July 24, the first day's journey took us down to the Terre Blanche falls; here we had to haul the boats over a small hill, as the river is a succession of falls and rapids for about half a mile; a very pretty place, the river runs between limestone cliffs, crowned with pine trees, and all stained bright orange colour with lichen.

On the 28th we reached the Athabasca, a splendid river, usually half a mile in width, sometimes more. Its course is pretty straight to the north, so we often had a view of some fifteen miles or so down the valley.

On the 29th, having a fair wind, we made a hundred miles. We met two lots of Indians; from the first we got some moose, the first fresh meat we had tasted for a long time, and from the others we got some raspberries and asketoon berries, which were very refreshing.

As we drifted down the river, the pines began to give place to poplar, the poplar to willow, and the willow to reeds, till at last we saw Lake Athabasca before us, a rocky coast to the north, and to the east water as far as the eye could reach.

A fresh breeze took us across the lake in two hours, and we received a hospitable welcome at this place, together with all sorts of luxuries that had become quite strange to us.

This is quite a large place; there are about a dozen houses, two churches, two bishops, a sisterhood, and some missionaries. The country is rocky, and most desolate. To the south and west the great lake stretches away to the horizon, and the land view is composed of hills of reddish granite, no soil, plants growing here and there out of occasional crevices, and a few stunted firs scattered about. There are woods in the valleys, but the trees are of no size. No sound breaks the stillness but the weird cry of the loon, a sort of maniacal laugh that is almost a wail; and the solitude is heightened by the reflection, that for 1000 miles north, south, east, and west all is wilderness.

Towards the lake the view is pretty, as there are many islands covered with pines.

The weather is cooler than it has been, I am glad to say. For days we had the thermometer at 85° and 86°, and even higher; but though hot, the summers are short, and I think that of this year is over. The mosquitos, at any rate, are beginning to disappear, and now the climate is nearly perfect, like the best English summer weather.

August 5.—There was a fine aurora last night: a curtain of flame seemed to descend from the sky nearly overhead and right across the sky, and after waving about for a few moments, died away again. Yesterday I went to see the Roman Catholic Mission; they have quite a pretty church, which has been built some thirty years. I was also taken to see the sisters, of whom there are six. They all seemed very flourishing, and have a very nice house.

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[1] Continued from p. 105.

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